For further information write:
A New Way To Go,
Queen's Park,
Toronto, Ontario

Government of Ontario
Hon. William G. Davis, Premier

Ministry of Transportation and Communications
Hon. Gordon Carton, Minister

Ontario

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STATEMENT BY

THE HONOURABLE WILLIAM G. DAVIS

PREMIER OF ONTARIO

AN URBAN TRANSPORTATION POLICY FOR ONTARIO

ONTARIO SCIENCE CENTRE, TORONTO

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AN URBAN TRANSPORTATION POLICY FOR ONTARIO

OBJECTIVE - THE KIND OF CITY WE WOULD LIKE TO HAVE

Any discussion of the urban environment and the associated transportation problems must begin with an idea of what urban life should be. What do we think city life ought to be? What are the characteristics of an ideal city? What are the benefits that should accrue to the inhabitants and to others in the Province and in the country?

First, the city should be a place that is rich in the variety of employment, housing and leisure opportunities which it provides. Traditionally the city has been the place where young people have gone to seek their fortune in the multitude of jobs provided in manufacturing, commerce, and all the store of abundant services we associate with thriving and growing cities such as those we have in Ontario. But the city is more than just a place to work. It should also offer a range of places to live and to raise a family.

Social and recreational opportunities of all kinds must be part of the fabric of our urban life. There should be abundant opportunities for people on the one hand to share culturally enriching experiences in theatre, music and sport and on the other hand to grow as individuals wishing to develop personal skills and to pursue personal pleasures.

Second, the city should be a place of safety, health and comfort. We have come to take for granted the purity of our water and the adequacy of our waste disposal system. Yet we have only to look to other parts of the world to know that such is not always the case. Historically, overcoming the health problems associated with large urban areas has been one of mankind's greatest tasks. We have also come to take for granted the safety provided by our system of law. Here too we live, comparatively speaking, in a privileged society.

Third, the city should be a place in which it is possible to move quickly and with safety and convenience from one location to another. It is a place where the children and the old people, and those who are without a private automobile should be able to move about safely and conveniently. Without easy circulation of traffic it would be difficult for the wide spectrum of people that make up a city to enjoy the fullness and variety we seek.

PROBLEMS OF CITY CORES AND RUSH HOUR

As any observer of the urban scene anywhere in the world will readily agree, the very success that cities have had in becoming places of interest, vitality, richness and commerce has carried with it the seeds of their potential decay - overcrowding, congestion, and stress. The downtown cores of most North American cities have fallen victims to these kinds of strains.

Fortunately, in this respect we in Canada seem to be running behind our southern neighbour but the signs are indicating that we may be moving in the same direction. Our downtown city centres are growing more dense and congested year by year. The demand to work and share in the excitement of the downtown is increasing.

In concentrating our attention on meeting the problems posed by these vast increases in rush hour traffic, we are dealing with what is essentially 20 hours per week of peak traffic time. This leaves 148 hours where traffic congestion problems are minimal but where other problems have arisen because public transportation could not adequately serve those who are without personal transportation.

The automobile, with its great convenience and flexibility has accommodated a large segment of the increasing movement of people. Unquestionably it has brought social and commercial benefits to our cities. At the same time commercial vehicles making door-to-door deliveries to homes and businesses are a life line in the food and goods supply chain of any major centre. The vitality of the city depends on automobiles and commercial vehicles continuing to play key roles in the overall transportation scene.

But the unrestricted use of cars and trucks during those few peak hours when people are going back and forth to work is the factor that has been making our transportation problems critical.

In these days of advancing technology it would be folly to continue to rely solely on the present day use of the automobile and our other existing systems of transportation. We now have before us a unique opportunity to move forward from pollution and bumper-to-bumper traffic jams.

EXPRESSWAYS - USES AND LIMITATIONS

Expressways as a means of connecting built-up areas provide a safe and efficient means of inter-urban transportation. In this respect Ontario has one of the finest toll-free systems in the world and this will be maintained in accordance with our goal of a balanced transportation system with each mode playing its most efficient role.

However, as a means of solving our urban transportation problems, expressways are not only too expensive for the traffic moved, but because of their accompanying intrusion, noise and air pollution, they have become unacceptable in residential areas. In addition, in urban areas they do not usually work efficiently since they tend to attract and encourage the use of automobiles to the point that they quickly become jammed over their capacities.

SUBWAYS - HIGH COST

Not only have expressways become prohibitively expensive within city boundaries, so have subways. Our technical people tell us that subway construction costs have reached such a high level that few municipalities throughout the world can continue their construction. At the present time they cost an average of 25 to 30 million dollars per mile. With the multitude of demands on limited public funds we must find less expensive ways to move people.

The decision of June 1971 to terminate the building of the Spadina Expressway was a move to sustain our cities on a human scale. It was an effort to preserve our attractive downtown residential communities with our parks, ravines and historic landmarks. It is interesting to note that the decision to halt construction of the Spadina Expressway set a pattern for many similar decisions in other cities around the world. At that time a sizeable portion of the population strongly suggested to us that larger cities are reaching a turning point and that a review and re-evaluation of our traditional forms of transportation was required. During the last year such a review has been taking place and in fact, in many parts of Ontario significant advances have already been made.

PROGRESS TO DATE
GO TRANSIT SYSTEM

An outstanding example is the GO train. It is now five years since the Government of Ontario pioneered this combination of commuter rail service and integrated buses.

Aside from offering a modern approach to attract car commuters off crowded highways, it is a practical experiment in the utilization of existing rail lines for commuter operations. It provides efficient suburban transportation for those who prefer not to drive or who do not own cars.

The service is operated by Canadian National Railways on behalf of the Government of Ontario and is a good example of a dual agency approach in this field. This service effectively removes about 14,000 cars from the highways along the lakeshore each day.

The eastern and western extremities of the rail service at Pickering and Oakville respectively were extended by the use of an express bus service to Oshawa and Hamilton in September 1970.

During 1970 the GO Transit service was extended to include the existing bus service between Toronto and Newmarket and Richmond Hill.

Last spring, the Minister of Transportation and Communications announced a further extension in the commuter service linking Metro. A limited rail service will be introduced during 1973 in the northwest corridor serving Malton, Bramalea, Brampton and Georgetown.

MUNICIPAL TRANSIT SYSTEMS

Before the decision to terminate the Spadina Expressway was made, the Ministry of Transportation and Communications already had a province-wide urban transit study in cooperation with 28 municipalities well under way. This program enabled the 28 localities to review their transit systems or to plan new ones in line with more modern developments in the transportation field. Sudbury, Oakville and North Bay led in the establishment of new up-to-date systems. In the course of these reviews, routes, schedules, the effects of changes in passenger volumes and the effect of changes on costs or revenues were studied in detail. Marketing, management and maintenance received attention. Methods of updating equipment, plant and premises were investigated. Careful attention was given to fare structures

and a number of alternatives were put forward. The integration of school buses and dial-a-ride service were studied. A number of original solutions to local problems emerged from the studies. Some of the most notable have been in the area of marketing which up to this time has been almost non-existent in the transportation industry. Many municipalities produced easy to read route maps and schedules, erected new bus stop signs and shelters and emphasized an attractive appearance for their buses. This emphasis on the needs of the passenger and the improvement of service has enlarged ridership considerably.

In Thunder Bay the whole maintenance program was reviewed and a recommendation made to construct a new central maintenance facility. The towns of Markham, Richmond Hill, and Vaughan have undertaken studies to determine their needs and capabilities of supporting additional transit service.

DIAL-A-BUS

Now just a word about the pioneer work done by the Ministry of Transportation and Communications in the dial-a-bus service. This service I am told was the first in the world and was designed primarily as a feeder service to the GO Transit station in Bay Ridges. The project is now two years old and has been growing consistently since its inception. Over 60% of those Bay Ridges residents who use the GO train now also use dial-a-bus. This significant impact is in contrast with the 20% market share achieved by a fixed route feeder service to the GO train which operated in the same community before the dial-a-bus service was introduced.

Following the obvious success of the Bay Ridges experiment several other services have been implemented in North America. The biggest one is in Regina where the vehicle design, despatching techniques and basic concept planning were all developed from the pioneer work done in Bay Ridges. Dial-a-bus service has now been introduced in Kingston and Stratford to provide improved and more economical service in the evening periods.

The future of dial-a-bus looks bright and the Ministry of Transportation and Communications fully expects to be involved in the implementation of further systems in Ontario. These new operations will take various forms both as self-contained transit systems or as feeders to existing fixed route services.

Possible locations for future demonstrations include the suburban areas of Toronto such as Downsview, parts of Willowdale, and northern Scarborough. Nepean and North Gloucester in greater Ottawa are also possibilities for further demonstrations.

NEW OAKVILLE AND SUDBURY TRANSIT SYSTEMS

I would like to give you one or two other examples of recent developments in the transit systems in cities outside of the larger centres. For example, in Oakville, the Ministry of Transportation and Communications has assisted in a study which led to a new bus system. Ten new buses serve this growing area and also take passengers to the GO train. A novel fare structure where passengers travel at a reduced rate during off-peak hours helps to spread the traffic load. Already the system, after only two months operation, is carrying three times the number of passengers carried by the system which it replaced.

Another example of provincial assistance to urban transit can be found in the Sudbury area, where a new municipally operated transit system has replaced the old privately operated one. The planning and design of the new system was subsidized by the Province.

Coupled with the new service in town there has been an expansion of service beyond the city limits to nearby smelters. Here the Provincial Government has worked side by side with municipal representatives and members of the local union and management. A combination of express buses, shuttle buses and dial-a-bus service will be used to link the city routes. This is an experimental program underwritten by the Province for a three-year period.

From these examples it is clear that many experiments and projects are already in operation in Ontario. We will be prepared to extend the experience gained in these activities to various parts of the province as well as into the larger centres such as Ottawa, Hamilton and Metro Toronto.

EXPANDED ROLE OF THE PROVINCE - BASIC PRINCIPLES

After a thorough assessment of all aspects of transportation and its relationship with the urban environment, we have developed a Provincial urban transportation policy based on the following:

(1) Recognition of the need for community-wide transportation systems that provide maximum service and convenience but which will not depreciate nor destroy community life.

(2) Cooperation with the appropriate municipal authorities in the development of alternative transportation facilities appropriate to local needs.

(3) Provision of necessary resources including both technical research and appreciably greater provincial financial assistance for transit services.

The Provincial Government has in the past two or three years clearly and definitely adopted a policy of developing and sponsoring an integrated transportation approach to the movement of goods and people in the Province. A number of extremely significant moves have been made in this direction.

Last year all transportation problems were brought within a single Ministry making it possible to plan and coordinate not only highways, but rail, air and urban transportation, and all forms of communication.

APPROVAL FOR NORTH-WEST CORRIDOR RAPID TRANSIT

As I mentioned earlier, the largest transportation problem facing the more densely populated urban areas of the world is related to the ever increasing problem of peak hour congestion. In a limited number of very densely populated areas such as parts of Toronto and Montreal, subways have been the traditional answer for high capacity movement of people. Toronto now has an extremly fine and efficient subway system and has plans to extend the existing University Avenue line in a northwesterly direction to Wilson Heights. The Province has committed itself to provide financial support for rapid transit in this corridor and fully intends to honour this commitment. Without commenting on the specific alignment which we feel is a matter for local decision, the independent studies carried out by the Province indicate the justification for a rapid transit service for this section of the city.

In general, however, as the cost of subway construction has reached such a high level, very few if any jurisdictions in the world appear to be capable of continuing to extend this system. Prospects are that in the next decade costs may exceed 40 million dollars per mile. Yet, subways have the undisputed advantage in heavily populated areas of having extremely high passenger carrying capacity of 35,000 to 40,000 people per hour. Buses on the other hand operating on city streets have a maximum capacity of 5,000 to 6,000 passengers per hour on each route.

INTERMEDIATE CAPACITY TRANSIT - A PROPOSED NEW SYSTEM

For some time there has been the pressing need for a public transit system which has a capacity intermediate between that of the subway and the bus system and which would be substantially more economical to construct than a subway system. With this objective in mind studies have been carried on for the past several years by engineering specialists in this field working within our Provincial Ministry of Transportation and Communications.

The studies have covered developments in all parts of the world and have been supplemented by independent studies of two of the foremost engineering and transportation consulting firms in North America - M.M. Dillon and DeLeuw Cather of Canada.

Their findings have indicated to us that the technology now exists to provide precisely the kind of economical intermediate capacity transit system which promises to fill the need in major urban centres such as Toronto, Ottawa and Hamilton.

The chief economy promised by these new systems is reduced capital outlay, based on the fact that they are more acceptable in an urban environment, and normally will not have to be built underground. The reason for this is that they are much lighter than conventional rail vehicles and are smooth and quiet as well as pollution-free. They may be supported on either rubber tires, magnetic suspension or air cushion. The development of new types of motors known as linear induction motors offers silent acceleration and braking of vehicles without contact with the track. Finally, the development of automated controls means that the operating cost will be considerably less than either subway or bus transportation.

The new intermediate capacity systems will operate on their own tracks or guideways either at ground level or above or below the ground when it is necessary to avoid interference with surface traffic patterns. The guideway systems have modern, clean designs and from the aesthetic point of view fit very well into the modern city. From a technical viewpoint, the system can be constructed in a way that will permit it to use the best of present technology and at the same time be capable of modification and improvement to incorporate new developments expected in the future, such as automatic synchronous controls. New transportation technology is now sufficiently advanced to enable us to plan extended hours, and express routes at very little, if any, extra cost. Since the system could eventually be fully automated in the same way that high speed elevators are fully automated, off-hour use and express service could be feasible.

These new systems could be designed for moving goods as efficiently as people, thus removing some heavy commercial traffic from existing roadways. An additional benefit from the passengers' point of view is that in most cases there will be an interesing and pleasant view of the city.

In summary, what we are discussing is a modern intermediate capacity transit system that is attractive

in appearance, smooth and quiet in operation, comfortable, safe and pollution-free. The major advantage is that it is sufficiently economical to permit it to be installed in a relatively short period to provide a far-reaching network of rapid transit for the Metropolitan Toronto area and also for Hamilton and Ottawa.

Our planners have done a study of the Metropolitan Toronto area including previous plans of the TTC for rapid transit and have found that new intermediate capacity systems lend themselves admirably to a logical development of the original concept of the TTC.

Metropolitan Toronto is fortunate in having a valuable network of access routes already existing in the city. These are the railway lines and the Hydro rights-of-way which can be used for the proposed new system. Intermediate capacity systems can be constructed economically above a railway alignment or to the side without interfering with the railway service. The Hydro rights-of-way have the additional advantage of offering almost unlimited free or extremely low cost parking along the routes. In addition, utilization of these rights-of-way has the overriding benefit of keeping costs down so that the Province and the municipalities will now be capable of providing a much larger comprehensive system than would be the case if land had to be expropriated.

Finally, the use of basic existing corridors will mean that the new transit system can be constructed with minimum disruption of existing traffic patterns and a minimum interference in the urban environment. There are some areas where land will of necessity be acquired but this will be minimal compared to the type of disruption required for an inner-city expressway.

In some areas a new intermediate capacity system can be built above the median strip on existing streets where these are wide enough. In other cases a single track could run along the side of streets and actually be incorporated into office buildings with stations for the new system contained within commercial buildings. The smoothness, quietness, lack of pollution and attractive appearance of the new system would lend itself to integration, for example, into shopping centres and other business establishments.

5 PROPOSED ROUTES IN METROPOLITAN TORONTO

Our planners have identified five possible routes in which the Municipality of Metro Toronto and the TTC may want to consider application of the new mode. The first route suggested would be from Union Station east to the Don River and up the Don Valley to Thorncliffe Park and Flemingdon Park and north-east following the Hydro alignment and terminating in the Malvern area of Scarborough.

A second route could branch off this alignment at Don Mills Road and carry north to the vicinity of Finch Avenue.

The third route would follow the railway line west of Union Station, north-west to Weston and to the vicinity of Eglinton Avenue where it would turn west and connect with Malton Airport.

The fourth possible route would branch from the third route at Eglinton Avenue and follow the Highway 400 right-of-way which runs north to the Macdonald Cartier Freeway. The route would continue along Jane Street to Finch Avenue.

The fifth route for consideration would connect the east and west alignments across Eglinton Avenue. This routing would be more difficult than the others in that it would have to be built for part of its distance along Eglinton Avenue, and in a central part of the city it would probably have to be buried, thus increasing the cost.

Finally, at some future date, consideration could be given to an east-west route following Finch Avenue and intersecting all these lines. This route could be extended to serve the new Pickering community development at the appropriate time.

Technical studies completed by our Ministry of Transportation and Communications also indicate that such a system could be partly operational within five years and largely completed within ten.

We do feel that an intermediate capacity system should also be considered an option to a subway in the North-west corridor. However, we also recognize that such an option may present operating difficulties for the TTC, or on the other hand could possibly have operating advantages from the total systems point of view. We would suggest that the TTC together with Metro and the Ministry of Transportation and Communications should consider which of these alternative modes best fits the needs of the community.

Our cost estimates indicate that the five intermediate capacity system routes, not including the Spadina corridor, would provide Metropolitan Toronto with a new transit system 56.1 miles in length and costing $756 million, which is an average cost of $13.4 million per mile, including all equipment, stations, yards and facilities. As I indicated earlier, the cost of cost of conventional subway construction is now running at approximately 25 to 30 million dollars per mile and has prospects of escalating into the range of 40 million dollars a mile.

The new system would provide a capacity of up to 20,000 persons per hour in each direction. Our studies indicate that this would meet the requirements of the Metropolitan Toronto area beyond 1990. In addition, the systems lend themselves readily to technological improvement and the addition of further lines at any time in the future to increase capacity.

3 PROPOSED ROUTES IN HAMILTON

Our studies in Hamilton indicate that the problem is more difficult largely because of the lack of rail lines and Hydro lines in appropriate locations. However, a tentative plan has been drawn up for these three routes.

An eastern route could begin at Mount Albion Road and use a Hydro right-of-way and existing rail corridors to get to the downtown area.

A southern route could begin in the downtown area and use exisiting streets before climbing the mountain and ending near Highway 6 and Mohawk Road.

A western line could begin downtown and use existing railway corridors and industrial properties to reach the Highway 2 and Main Street area.

Our estimates for Hamilton indicate that for a total system 17.3 miles in length, include rolling stock, stations and all equipment, the cost would be 283 million dollars, or an average of 16.5 million dollars per mile. This is a somewhat higher cost than in the Toronto area because of the lack of suitable rights-of-way, as I mentioned earlier.

PROPOSED ROUTE IN OTTAWA

The City of Ottawa appears to have the required transsit needs to justify construction of a similar system.

The suggested route would begin at Viewmount Drive in the West End. It would follow Merivale Road to the Queensway, and proceed north along the Hydro corridor to Scott Street. It would continue east and go underground along Slater Street through the central business district.

Crossing the Canal at the Laurier Bridge, the route would follow Nicholas Street and the Queensway to the Union Station. It would proceed south along the Hydro right-of-way to Smyth Road. Finally, it would go along the proposed Highway 417 busway to a terminal at Walkley Road.

Studies indicate that the cost for the complete system 11.4 miles in length including excavations and equipment would be $195 million, or approximately $17.1 million per mile.

PLANS FOR DEMONSTRATION PROJECT

I have described the possible application of a new form of intermediate capacity transit in the Metropolitan Toronto area and in Hamilton

and Ottawa. We are anxious to have the earliest possible discussion with local authorities on further detailed consideration of these proposals.

For its part the Province of Ontario is now well advanced with plans for a prototype development, demonstration and test project which will permit full testing of all aspects of the new technology under local conditions. Three major companies have been asked to submit proposals and these are due in February 1973. By the spring of 1973 a contract will be let for the building of a demonstration track and vehicles for a two-mile route at the CNE. Our plans call for testing this system in operation in late 1974. Our target date for completion of construction and equipment for the first urban route is 1977.

INTERIM MEASURES

However, it should not be necessary to wait until the proposed intermediate capacity system is fully operational to gain benefits from the available transportation corridors mentioned earlier. As an interim measure it may be feasible to provide express routes through parts of these corridors using existing modes of transportation such as buses or streetcars. When operating in exclusive rights-of-way these facilities are capable of providing intermediate capacity transit facilities. Hydro rights-of-way are particularly appropriate for such systems, with ample space for commuter parking. Such an approach would have the benefit of providing immediate relief to traffic congestion in some areas. In addition, the provision of service at an early date will develop patterns of transit use which will assist in the economical implemetation of the new intermediate capacity system at the appropriate time.

This approach also offers an earlier response to the need in such corridors as the Finch alignment previously mentioned, in which the economic application of a new system is still many years off.

COOPERATION WITH MUNICIPALITIES

I would now extend an invitation to municipal governments in these cities, as well as

to their transit authorities to study these proposals, to evaluate them in the light of their needs and to come back to the Provincial Government with their comments or alternative proposals. I give my assurance that these responses will receive the fullest possible consideration. My Government has set as one of the highest priorities the full cooperation with municipalities to provide the best possible systems of urban transportation.

In the case of smaller urban areas as well as towns, it is clear that neither subways nor intermediate capacity transit systems are practical. However, studies have been completed indicating that express buses, dial-a-buses and similar forms of public transportation can be made attractive and viable in many areas. I have already mentioned the number of experiments and pilot projects which are being carried out with the full cooperation of certain municipal governments.

To other municipalities, I extend the same offer which has been extended to Toronto, Ottawa and Hamilton. We invite them to consider local transportation needs and to make proposals to the Provincial Government for the development and implementation of appropriate transportation systems.

FINANCIAL PROPOSALS URBAN TRANSPORTATION

To indicate my Government's determination and concern in this whole matter, I would now like to set forth certain proposals regarding the financing of urban transportation.

At present, the Province pays to municipalities 50% of construction and maintenance costs for road purposes. In addition, the Province pays a higher rate of grant for connecting links through municipalities for Provincial highways.

Transit subsidies recently introduced provide 50% subsidy of the deficits incurred by public transit systems up to a maximum amount limited by a formula. Some years ago, the Province began paying 50% of the capital costs of subway construction and in 1971 this 50% subsidy was extended to include equipment costs and rolling stock.

However, up to now, the Province has not paid direct subsidies for the purchase of surface transportation equipment such as buses, streetcars, trolley buses and intermediate capacity systems of the type proposed, as well as support facilities such as parking lots.

Effective December 1, 1972, the Province will now also pay up to 75% subsidy for approved capital expenditures on this type of facility. Among other benefits, this policy will permit the TTC to retain and upgrade its existing system of streetcars which continue to have many advantages, particularly when used in conjunction with exclusive rights-of-way.

COMPUTERIZED TRAFFIC CONTROL

In attacking the transportation problems of our urban areas, it is necessary to consider not only the provision of public transportation but also how the existing system of streets and roads can be used most efficiently, particularly in the relatively short rush-hour periods.

In this field Metropolitan Toronto with its computer controlled traffic system is one of the leading jurisdictions in the world. For a comparatively small investment in the necessary technical equipment, a very substantial increase in road capacity has been achieved. The resulting saving in road construction costs is many times the original expenditure on technical equipment. In this regard my Government is prepared to offer substantially increased financial assistance to Metropolitan Toronto for upgrading and expanding the capability of this system. In addition, we will be prepared to give favourable consideration to similar proposals from other major urban areas. Effective December 1, 1972, the Province will now pay 50% of the cost of such measures. This will also apply to the installation of traffic signals to improve traffic safety and flow.

STAGGERED OR FLEXIBLE WORKING HOURS

It is also worthwhile to consider how the demand on the roads and transportation systems during rush-hour might be altered. In this regard, we are very encouraged by the work that has been done by Metropolitan Toronto, by the Toronto

Board of Trade and by the TTC in studying the question of staggered or flexible working hours for major businesses. We see this as an extremely promising method of reducing the peak-hour congestion. The government is now prepared to provide substantial financial assistance to municipalities wishing to study and implement such projects. Effective December 1st the Province will pay 75% of the cost of such studies. In addition, the government itself employs approximately 10,000 people in the central Toronto code area. As a major employer, it will cooperate fully in any scheme to reduce rush hour congestion through the provision of flexible working hours.

TRANSPORTATION STUDIES

The Provincial Government will also continue to provide financial assistance at the rate of 75% in the whole field of transportation studies. This is for the purpose of encouraging the study of such concepts as one-way streets, scheduling of servicing and deliveries, and parking policies.

COST OF FINANCIAL PROPOSALS

The Provincial Government's share of the cost of all these proposals has been estimated at an average of $135 million a year for the next ten years. The objective of this major new transportation program is to ensure the continuing quality and vitality of our urban areas in the decades ahead.

FEDERAL GOVERNMENT PARTICIPATION

As our plans for alternative methods of transportation are developed, we invite the participation of the Federal Government in terms of planning, developing and financing the required system. It is noted that the Federal Government's counterparts in many other countries are placing a very high priority on the provision of funds for urban transportation. The United States Government is now proposing a major new program to provide assistance to state and local governments for this purpose.

In the City of Ottawa direct Federal Government participation will be particularly appropriate as a recognition of the fact that a great part of the expenditure on transportation

is of direct benefit to the Federal Government and its central agencies in the Ottawa area. In the past the National Capital Commission has taken a great interest in the development of the Ottawa road system; it would follow that financial support should also be given to the construction of alternative means of transportation.

REGIONAL TRANSPORTATION AUTHORITIES

As we have seen from our review of the many and varied methods that may be used to come to grips with the transportation problems of large urban centres, no one or even two methods will suffice. It will need to be a concerted attack. Coordinating the use of roadways with railways, streetcars and buses and perhaps other modes will require the highest degree of cooperation from all agencies in the field.

Perhaps some form of Regional Transportation Authority will be required to bring this cooperation about; it might well be done simply by those involved joining forces in the very large job of providing integrated transportation service.

HELP FOR NORTHWEST QUADRANT OF METROPOLITAN TORONTO

Finally, I would like to close with a word or two to residents of the northwest corridor of Metropolitan Toronto. For the past few years while the public has been debating the merits of a change in direction of public transportation policy, this growing community has had to endure increasingly difficult traffic congestion.

In the long run, we are convinced that our new proposals will bring substantial relief. But I feel we owe this community some shorter-term help.

It is recognized that even with an immediate approval to proceed with construction of a rapid transit in the northwest corridor of Metropolitan Toronto it will be a number of years before service is available to this section of the city. The government is therefore prepared to provide substantial financial assistance to install in this part of

the city a demonstration project based on the dial-a-bus and express bus principles described earlier. There are indications that this system, combined with computer scheduling, can have a substantial impact on the problem of rush-hour traffic.

Although these temporary measures will not be sufficient for the long-term, they should make a significant contribution to the comfort of passengers travelling from the northwest to the centre of Metro.

LAND DEVELOPMENT ALONG TRANSIT ROUTES

The effect of a far-reaching transit network on the whole fabric of the city is a subject which will require continuing study. One only has to look along Yonge Street and east and west along Bloor Street to see the dramatic effect on development brought about by the installation of rapid transit. Since the new intermediate capacity system could extend over five new lines, in Toronto this will have the effect of spreading out the development over wider sections of the city. With this natural concentration of development along transport corridors, and in order not to overload the system in any one place, it may become necessary to plan the siting of large buildings more consciously in the future than has been the case in the past. Such commercial development should offset most of the expenses of the original land acquisition and bring people close to the transportation system.

In connection with the Spadina rapid transit route, Provincial approval now given opens the way for early redevelopment of the property which was acquired north of Eglinton Avenue. Regardless of the transit system chosen for implementation, or the decision on a routing south of Eglinton, land above and beside the route as far south as Eglinton could be made available at an early date for municipal or commerical use. The way is now open for consideration of the imaginative Buckminster Fuller proposals which are on record, or for reasonable alternatives. In this regard the Provincial Government will provide full cooperation to Metropolitan Toronto and the TTC in the redevelopment of this area.

A new transportation system will also make possible an attractive alternative to high-rise, high-density living and to suburban sprawl. It will encourage moderate density residential areas which may bring about a new sense of community belonging, not unlike the cities of the past which also evolved around major public transit systems. In this respect the new systems are sufficiently economical to provide transportation as an encouragement to growth in appropriate areas, rather than merely responding to growth as it occurs.

SUMMARY PROVINCIAL POSITION

In conclusion, may I summarize our position. The Province of Ontario is committed to a policy of an integrated approach toward the transportation of people and goods within the Province. With that policy in mind, the Government has already done the following:

- Brought together all transportation responsibilities of the Government into one Ministry to permit better planning and coordination.

- Taken steps to coordinate our transportation planning with the municipalities, thus developing a truly provincially integrated netork.
- Extended the municipal subsidy for transportation planning. At one time, the subsidy was available for development of roads only. Now it includes all other forms of transit.

- Provided aid to municipal transit systems in the form of deficit subsidies.

- Broadened subway subsidies to include construction, rolling stock and stations.

- Developed, in partnership with municipal authorities, new transit systems and upgraded existing ones.

- Financed demonstration projects in the public transit field.

- Evaluated new modes of transit, particularly the intermediate capacity type.

We are now ready to move into the next phase and to assist, to a greater degree than ever before, in the planning and financing of public transportation systems which will emphasize the comfort and convenience of people in all parts of Ontario.

PROPOSED SIX-POINT PROGRAM

The Province will shift emphasis from urban expressways to a variety of transportation facilities, which will put people first. This policy will be implemented through a six-point program:

First, subsidies of 75% for the purchase by municipalities of buses, streetcars and trolley buses and related facilities;

Second, the development at Provincial expense of a prototype and operating demonstration of a new form of intermediate capacity transit system together with a subsidy program of 75% to assist municipalities in applying the system to meet their needs;

Third, subsidies for programs to alter demand for transportation at peak times such as the encouragement of flexible working hours to spread peak loads in major cities;

Fourth, subsidies of 50% to urban areas for upgrading and expanding computer controlled traffic systems;

Fifth, continuation and expansion of studies in cooperation with municipalities in order to maximize the use of existing roadways through the study of such means as one-way streets, delivery and parking policies;

Sixth, an intensification of Provincial efforts and resources devoted to the coordination of transportation planning among the municipalities in Ontario.

With the cooperation of the municipalities we are certain that we have the opportunity to develop a transportation network that will put Ontario foremost in the world in this important field. Its purpose is to provide a comprehensive "people first" transportation system which will permit orderly development, improve the quality of life in our urban areas, and conserve our land resources at reasonable cost to the taxpayers.

I invite the citizens of Ontario and the municipal leaders in the Province to join with us in evaluating these proposals and in developing plans for implementation.

NEW TRANSIT TECHNOLOGY

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BACKGROUND AND RATIONALE
FOR INTRODUCTION OF NEW TRANSIT MODE

The automobile has unquestionably brought social and commercial benefits to our cities. However, recognition of the adverse effects of the automobile on the quality of urban life has intensified opposition to construction of road facilities, particularly urban freeways. The major barriers to acceptance of urban freeways are the perceived adverse social, environmental, and economic impacts of those freeways on the communities through which they pass: pollution, noise, large capital costs, and large land requirements which result in displacement of families, disruption of neighbourhoods, destruction of public buildings, loss of park areas and loss of tax base. The capital cost of a 6-lane urban freeway may range from $10 to $35 million, per mile, with typical values to the order of $20 to $25 million.

This recognition of adverse automobile impacts has led to increased interest in public transportation. The major problem with conventional transit, however, has been its lack of attractiveness to users. Until recently, no valid alternative to the automobile could both satisfy the public demand for convenient, comfortable service and be installed and operated economically.

Analysis of current urban transportation patterns indicates the problem clearly. For example, in Toronto, approximately 30% of all trips are made by public transit. However, perhaps only 15% of the people who use transit do so by choice; the other 85% are "captive riders", in that they have no alternative. Use of the automobile despite

its adverse social and environmental effects, continues to grow because the automobile can provide service features that cannot be matched by conventional transit systems.

The improvements necessary in transit systems are indicated by consideration of those service features that the automobile, despite increasing road congestion, has till now been able to provide:

A. The ability to travel from any point in the city to any other by a direct route. With the increased dispersion of centres of activity within the urban areas, this service will become increasingly difficult to provide by transit, in the absence of extensive transit networks.

B. Short door-to-door travel time and immediate availability, without long delays and frustration due to long access times, infrequent service, unreliable schedules, and numerous transfers associated with the existing transit systems.

C. Low trip cost in terms of out-of-pocket expenses for gasoline and oil which are more apparent to the user than the true cost, which includes initial purchase, insurance and maintenance.

The characteristics of the two most common types of conventional urban transit indicate the difficulty of providing the service features demanded by the travelling public. At one extreme are subways, capable of delivering very high capacities, 40,000 passengers per hour per direction, but, because of their extremely high costs ($30 to $40 million per mile, or more), not justified at peak-hour demands less than about 20,000 passengers per hour per direction. Such demands exist only along a few corridors, even in large cities. The high cost of subways makes

extensive networks prohibitive and therefore prevents them from providing direct transportation from many destinations. Further, while subways provide frequent and reliable service, access times to the system may still be long except for people living or working immediately along the subway route. Finally, the high capital cost of subways makes it difficult to provide attractive fares for use of the system, without massive subsidies.

To the lower end of the capacity range are buses, with typical capacities on shared rights-of-way of about 3000 passengers per hour, to a maximum, of 6000. On exclusive rights-of-way, higher capacities are achievable, but at much higher cost. The use of shared right-of-way (i.e. on city streets in mixed traffic) helps keep the capital cost of bus systems down, but it is this very feature of bus transit that contributes to high operating cost and unattractive service for the user.

Bus operating costs on city streets are high, partly because bus transit is labour-intensive, requiring an operator on each vehicle. As labour costs increase, bus operating costs and fares are likely to rise quickly, making the service less attractive to the user. Also, bus service is often unattractive for the user just because it operates in the congestion of mixed traffic, resulting in long travel times. Further, long access times, infrequent service, unreliable schedules, transfers, and crowding are common with bus transit. The high operating cost of buses leads to a vicious circle of decreased service frequencies caused by declining patronage, caused by decreased service frequencies, and so on. Buses also have several undesirable environmental

effects, particularly smoke, odour, and noise - although these nuisances are being reduced by developments in technology.

These comments on subways and buses are not intended to imply that such systems have no feasible applications, nor that any alternative transit system would be a panacea to urban transportation problems. Subways will probably continue to be used for high-demand corridors. Buses will continue to be used for low capacity service, but possibly in innovative ways (e.g. dial-a-bus) that will provide improved service at little or no extra cost. In light of the stated deficiencies of these systems, however, there is a demonstrable need for improved transit systems that can supplement or, in some instances, substitute for subways and buses.

In order to meet this need for intermediate capacity service between high capacity subways and low capacity buses, i.e. between 6000 and 20,000 passengers per hour, a number of systems incorporating advanced technology (suspension, propulsion, and, in particular, automation) have been developed. These intermediate capacity systems are quiet, pollution-free, safe, and comfortable. They offer the potential for improved service at reduced cost, and are expected to find application as supplementary or secondary systems in large metropolitan areas, such as Toronto, or as primary transit systems in smaller cities like Ottawa and Hamilton. Estimated capital costs of these systems range from 13 to 17 million dollars per two-way mile. Hence, about two or three miles of such a system could be built for the same cost as one mile of subway. A more extensive network for

the same amount of money will not only provide more attractive service to the user, but may do away with the need for subways at all, for the dispersion of demand over several routes may keep individual route demands below the level of 15,000 or 20,000 passengers per hour. Building the new systems, on existing Hydro and rail rights-of-way, ensures lower costs and there should be less disruption to the urban area both during, and after construction.

Compared to buses, the intermediate capacity systems operating on their own rights-of-way offer lower operating costs, largely because of automation. Automation reduces labour costs and at the same time offers more convenient, attractive service because the system can be operated with good service frequencies around the clock at minimally increased cost.

In order to provide the most attractive and convenient service possible, the intermediate capacity transit system must be integrated with other modes: automobile (parking, kiss-and-ride); feeder bus lines; walking; bicycles; subway.

ELEVATED GUIDEWAYS

Although the new medium capacity transit systems can be operated at ground level, or even underground, they are specifically designed for elevated guideways. The use of lightweight vehicles permits guideway structures of rather modest proportions while the near-elimination of major noise generators from the vehicle systems permits the penetration of elevated guideways into areas that would be prohibited to conventional vehicles on an elevated track.

The actual width of the guideway structure will not be determined until a particular design is optimized for implementation, however, it may be as narrow as 4 or 5 feet. It will be supported on slender columns about 16 feet high spaced at intervals from 60 to 100 feet or more. Stations too, will be elevated in most instances and may even be incorporated into the second level of large commercial buildings. Boarding platforms will resemble elevator lobbies with boarding through sliding, elevator-type doors which will only open when there is a vehicle ready to receive passengers.

In terms of land use, an elevated guideway is less demanding than any other type of transportation corridor - road or rail. Since it requires only a few square feet of land every 100 feet or so on which to place footings, an elevated system can

easily be constructed on or over existing rights-of-way such as hydro and rail lines or the median strip of freeways. With suitable aesthetic design, an elevated system may even be placed along arterial roads.

Because it is 16 feet in the air, passengers will be able to enjoy a unique visual perspective of their city. As well there would be no interference with the cross-flow of regular pedestrian and vehicular traffic and no threat to the safety of children. In non-urbanized areas, "linear parks", similar to those already established under the BART system in San Francisco could be developed along the route.

In spite of this great potential, there will be situations in which it is aesthetically difficult to place an elevated

guideway. This problem can be avoided by careful route planning, by running the guideway through a depression to screen it from sight or, if necessary, placing it underground. Architects have also noted that an elevated guideway structure can be designed to harmonize with the architectural theme of an area. Some have gone so far as to suggest that the guideway be used as an aesthetic tool, introducing an active element of interest into a rather dull environment, or imposing a degree of architectural integrity upon a collection of previously non-related buildings.

A counter-point to these aesthetic considerations, are the significant social benefits deriving from an elevated guideway, as opposed to conventional transportation systems. Elevated systems will require almost no acquisition of private property - in contrast to the widespread expropriations typical of freeway, and sometimes subway construction. No communities or neighbourhoods will be disrupted, and the interference with normal traffic and commercial activity caused by construction will be minimal or non-existent.

Guideway sections, and perhaps even support pillars, will be largely pre-fabricated of concrete and steel and erected on-site in a matter of days. The moderate use of materials and such labour-saving techniques, drastically reduces capital costs and permits the construction of many more miles of transit line than would be possible with conventional systems - and in less time. The resultant extension of rapid transit facilities throughout the community is one of the outstanding social benefits of a new technology, elevated system.

AUTOMATIC CONTROL

Automated transit systems are not new. Every day, the Victoria Line in London, the Lindenwold Line in Philadelphia, and others, carry thousands of commuters on trains operating under automatic control. The new medium capacity transit system now proposed for Ontario, will further extend the application of automatic control to include virtually every aspect of system operation. The result will be a level of transit service unexcelled anywhere in the world.

In any transit operation, safety is of paramount concern. Reliability and frequent service are important to the riding public and low maintenance and operating costs are the goal of the operating agency.

Safety is assured by the use of computers to control the actions of every vehicle within the system. Because the computer is not subject to human error, vehicles can be run at closer intervals than would be possible under human control. The capacity of the system to carry passengers is thus increased as well as the safety. In addition, all vital components of the control system are designed to be fail-safe and many are duplicated with identical components which automatically take over a vital function in the unlikely event of a failure. This design approach is typical of the highly successful aerospace industry and tends to ensure the reliability of the system.

Computers and electronic sensing devices are also used to monitor the system and faulty components can be replaced before they fail. The control system can further contribute to reliability and lower maintenance costs by scheduling vehicles for regular servicing. Because an automatically controlled

transit system is not labour-intensive, it is economically feasible to extend frequent service into off-peak, as well as rush hours - a significant improvement in user convenience.

The level of service offered to the public will be improved by the use of off-line stations which will permit passengers to board, and to leave vehicles or trains without delaying traffic on the main line. This practice is vital to allow the automatic routing of vehicles from origin station to destination without stopping at any intermediate stations along the way.

This type of transit service is a closer approach to dealing with personal transportation needs within a public system than anything we have yet experienced. The computer control will allow a passenger to inter-act with the transit system in a very positive way. In off-peak hours, the passenger may push a button to "call" a vehicle to his station and another to indicate where he wants to go. Flashing information boards may tell him how long he has to wait for a vehicle, or which "gate" he should proceed to for boarding. Travel instructions may be provided in a similar fashion.

In addition, advanced control techniques will be extended to include automatic fare collection. One might purchase a long-term ticket, resembling a credit card, but magnetically coded with the name and address of the owner and/or the cash value of the ticket or the credit balance due to the customer. The appropriate fare would be electronically deducted from the card with each use or automatically added to the customer's account for monthly billing.

The initial implementation of new medium capacity transit in Ontario might not reflect this very high degree of sophistication,

but the potential for early growth into this type of system will be built in and the advanced techniques incorporated as they are refined and developed at the CNE Demonstration Track.

THE LINEAR INDUCTION MOTOR

The linear induction motor (often called the LIM) is neither new in concept nor extraordinary in principle. Although it was first proposed in 1895 and is, in fact little different in principle from ordinary electric motors used daily in every home, it is only within the past decade that the linear induction motor has been developed as a device to propel transit vehicles.

Like the ordinary electric motor, the LIM consists of two basic parts - the primary, containing the coil windings required to produce a magnetic field and the secondary, which is little more than a block of metal reacting to the field produced by the primary. In the ordinary motor, the secondary turns a shaft. In the linear motor, the secondary is a flat metal plate and a linear force is exerted between the separate parts, one of which is attached to the bottom of a vehicle while the other is fixed to a track or guideway.

Because neither of these basic parts contain anything which moves, and because the parts do not physically touch each other, the LIM may be said to be without moving parts as we usually understand them. This results in a motor which produces virtually no noise and requires exceptionally little maintenance.

The thrust produced by the linear motor may be precisely controlled to provide various speeds of operation and maintain desirable rates at acceleration. In addition, its thrust may be reversed to provide reliable braking force, independent of the surface conditions of the track or guideway along which the vehicle is running - a major advantage for Ontario use.

THE PRINCIPLE OF THE LINEAR INDUCTION MOTOR

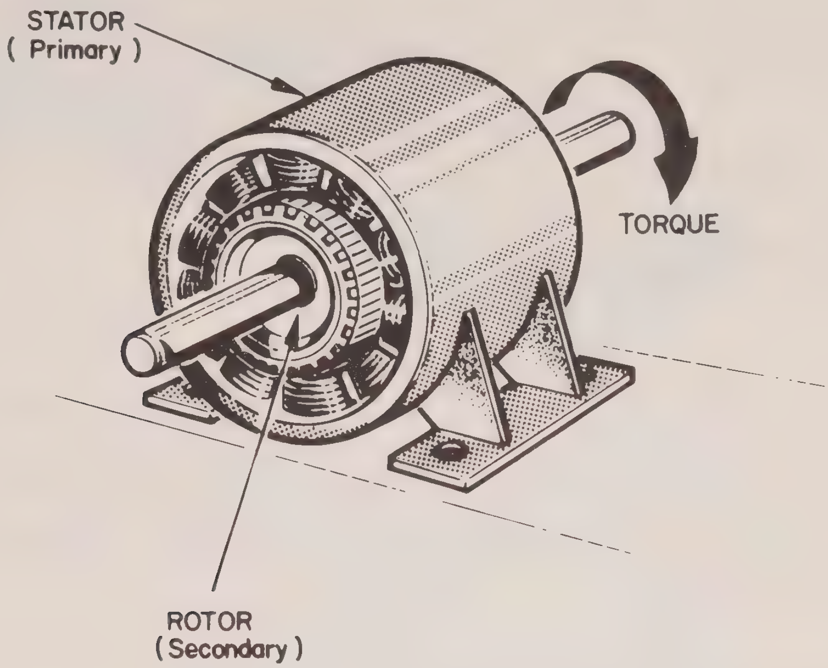


Fig. 1 In an ordinary electric motor, current applied to the coil windings causes a magnetic field to travel around the primary. A corresponding field is induced in the rotor or secondary which tries to follow the primary field around, causing the shaft to rotate.

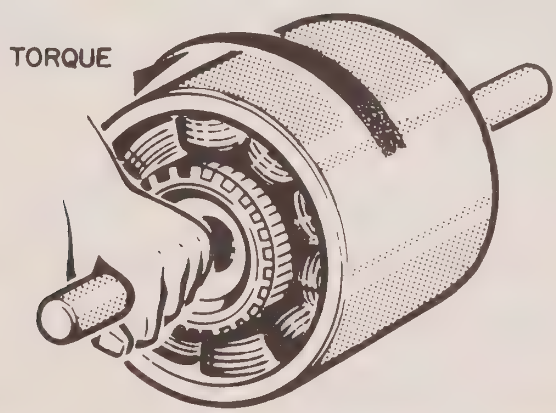


Fig. 2 If the shaft and rotor were prevented from turning, the primary would rotate instead - but in the opposite direction.

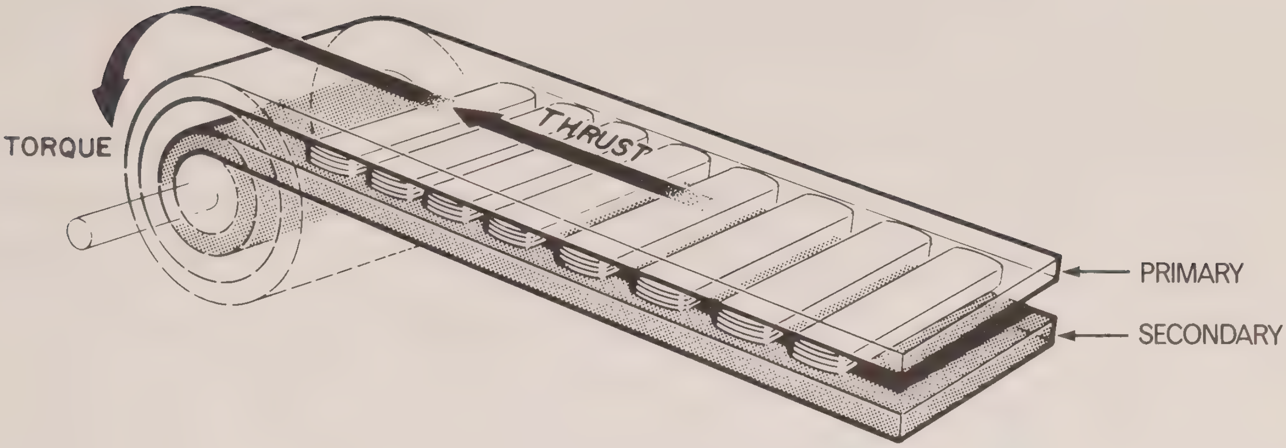


Fig. 3 In concept, the Linear motor is simply an ordinary motor rolled out flat but reacting the same way when current is applied to the windings.

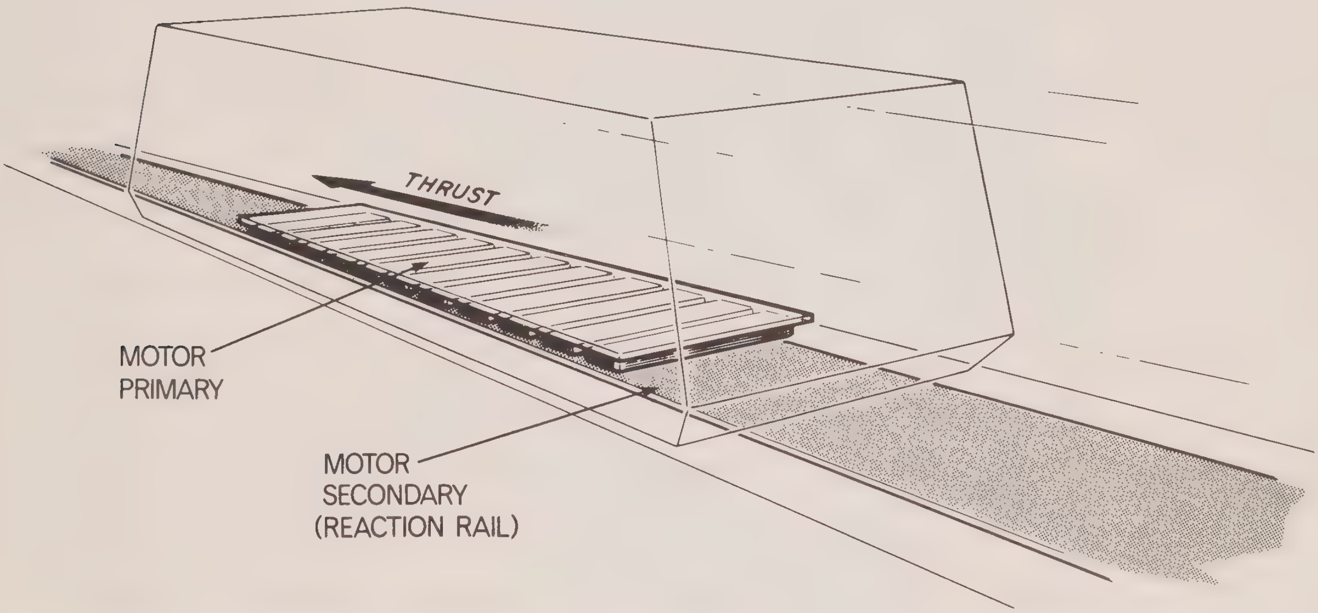


Fig. 4 The primary windings become a part of the vehicle and the rotor becomes a flat metal plate or "reaction rail" firmly fastened to the guideway.

When current is cycled through the primary coils, the reaction rail cannot move so the vehicle must, and propulsion is achieved.

MAGNETIC VEHICLE SUPPORT

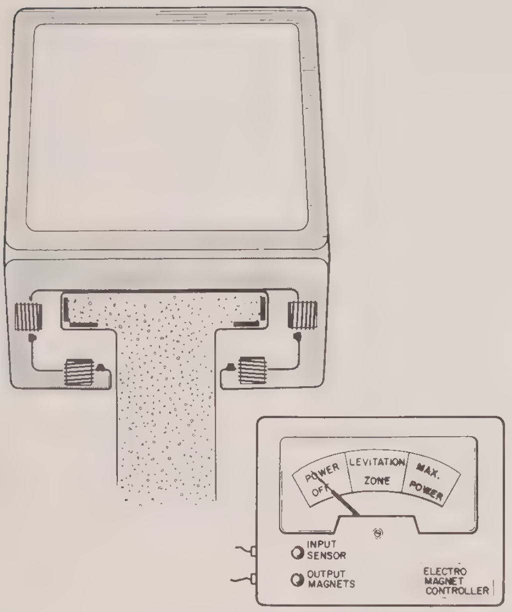
Within the past few years, practical methods of employing the attractive force of ordinary electromagnets to provide frictionless support to transit vehicles have been devised. When a flow of electricity is applied to electromagnets attached to a vehicle, the magnets are attracted towards iron strips laid down along a special track or guideway. The strength of this attraction is a function of the amount of electricity supplied to the magnets and it is easily powerful enough to lift a fully-loaded transit vehicle the short distance required.

Sensors continually measure the distance between the magnet face and the iron strips on the guideway and relay that information to an electronic control device which reduces the electricity supply to the magnets if they get too close, and increases the supply if they move too far from the guideway. The response of the sensor-magnet-control system is so rapid that the proper clearance between vehicle and guideway is maintained within several millimeters at all times. In effect, the vehicle "floats" - free of any contact with its guideway but inextricably tied to it by the forces of magnetism and gravity. A magnetic support system is, moreover, fail-safe, with vehicles mechanically keyed to the track to prevent "derailment" and the vehicle simply coming to rest on its guideway in the event of a power failure.

Almost ideally suited to urban transit applications, magnetic vehicle support is silent and vibration-free, and it is little effected by adverse weather conditions and guideway irregularities. In addition, the system is mechanically simple,

having no moving parts in the usual sense and no physical contact between vehicle and guideway - two factors having a dramatic impact on maintenance costs.

NO POWER - VEHICLE AT REST

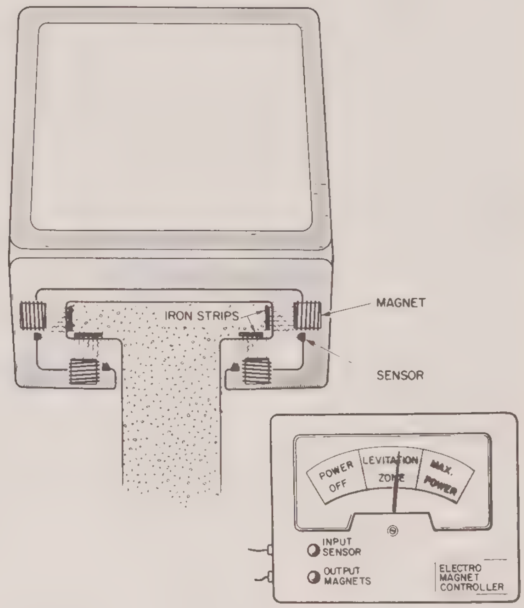


No power is supplied to the magnets when the vehicle is stopped in a station. The vehicle thus rests firmly on its guideway to ensure a stable platform for boarding passengers.

Should the power to the magnets be interrupted for any reason while the vehicle was underway, the vehicle would simply settle down onto specially-designed brake pads or skids and come to a safe, smooth stop.

Transit vehicles will be equipped with an emergency power supply to take passengers to the next station.

POWER ON - VEHICLE LEVITATES



Power to the electro-magnets is carefully controlled to balance the opposing forces of gravity and magnetism. When the upward pull of magnetism equals the downward pull of gravity, the vehicle "floats" on a frictionless magnetic field without touching the guideway. Contact-free lateral guidance is provided by a similar technique which balances the magnetic forces pulling the vehicle to each side.

DESCRIPTION OF PROPOSED INTERMEDIATE CAPACITY TRANSIT SYSTEM ROUTES IN TORONTO

GENERAL CORRIDORS

The Intermediate Capacity Transit System Routes in Toronto from the northeast and the northwest converge to terminate near the present Union Station and the future Metro Centre transportation terminal.

The northeast routes from Don Mills Road and Finch Ave. and from Malvern and Finch Ave. merge south of the Ontario Science Centre. Likewise, the routes from the northwest starting at Malton and at Jane St. and Finch Ave. merge in the vicinity of Weston Road and Eglinton Ave.

A fifth route, the Crosstown, would provide an east-west link across the uptown section of Toronto.

A line along the Finch Avenue Hydro right-of-way could be

built at some time in the future, connecting with the other proposed routes and providing a further crosstown link.

THE NORTHEAST CORRIDORS

Don Mills Route to the Junction with Malvern Route

Starting at the Ontario Hydro right-of-way at the north end of Don Mills Road near Seneca College, the guideway would follow the Don Mills Road corridor southwards to its junction with the Malvern route. It would be constructed along roadway medians and boulevards and in presently undeveloped land. Special considerations along this section of route would be directed to building the facility so that it would offer the least degree of intrusion to abutting properties. Such measures would include consideration of roadway realignment so as to provide sufficient latitude for locating the guideway in the least obtrusive position.

The new system would service the densely populated residential areas around Don Mills & Finch, Fairview Mall, the community of Don Mills and the active commercial and residential area around the Ontario Science Centre.

Approximate travel times from these points to Union Station would be as follows:

Finch Avenue	30 minutes
Fairview Mall	27 minutes
Don Mills Plaza	20 minutes
Eglinton Avenue	18 minutes

Malvern Route to Junction with Don Mills Route

From the Canadian Pacific rail line near the Malvern residential development, the route would follow an abandoned rail right-of-way to Sheppard Ave. and would then cross over Highway 401 to join the Ontario Hydro right-of-way near Ellesmere Road. From this point the route would follow the Hydro right-of-way to Don Mills Road where it would merge with the Don Mills route.

In addition to providing transit service to Malvern, the line would cater to the residential and industrial areas in central Scarborough with access stations located at major north-south streets such as Victoria Park, Warden, Kennedy, Brimley, McCowan and Markham Rd.

Approximate travel times from points on this line to Union Station would be:

Malvern	40 minutes
Markham Road	32 minutes
Victoria Park	20 minutes

Junction of Don Mills and Malvern Routes to Union Station

From the junction point of these routes, the guideway would be constructed along Overlea Blvd. to Millwood Road and would then follow the west side of the Don Valley to join the existing rail right-of-way near Eastern Avenue.

The route would provide convenient transit to residents of Thorncliffe Park and would interface with the Bloor-Danforth subway at Prince Edward Viaduct.

From Thorncliffe, the approximate travel time to Union

Station and to Bloor Street would be 11 minutes and 6 minutes, respectively.

THE NORTHWEST CORRIDORS

Malton Route to Junction with Jane Route

From the intersection of Airport and Derry Roads (and the future GO commuter rail station) the guideway would be constructed along Airport Road, Dixon Road, Highway 427 and the Hydro right-of-way to Richview Side Road.

Along Richview, the guideway would follow the planned route of the Richview Expressway to its junction with the Jane route near the intersection of Weston Road and Eglinton Avenue.

The system would provide convenient public transit access to the Malton industries, Malton Airport, and the hotels and industries at the west limit of Metro. Along Richview Side Road, stations would service the residential areas of Etobicoke such as at Kipling Ave., Islington Ave., and Royal York Road.

Approximate travel time to Union Station from points on this route would be as follows:

Malton	37 minutes
Malton Airport	31 minutes
Martin Grove Rd.	25 minutes
Royal York Rd.	20 minutes
Weston Rd.	15 minutes

Jane Route to Junction with Malton Route

From Finch Ave. the guideway would be constructed along the Jane St. corridor to the south end of Highway 400. From

this point it would follow the right-of-way of the Highway 400 Extension to its junction with the Malton Route near Eglinton Ave. and Weston Rd.

Special consideration will be given to the location of the facility along the sections of the route where it would be constructed close to residential properties. Modifications to the alignment of Jane St. may be necessary in order to provide sufficient space to enable the guideway to be constructed in as favourable a location as possible.

The residential areas along Jane Street would be well served by the proposed facility which would also provide access to the industrial areas near Keelesdale Rd.

Approximate travel times to Union Station from sample access stations on this route would be as follows:

Finch Avenue	29 minutes
Sheppard Avenue	25 minutes
Wilson Avenue	21 minutes
Lawrence Avenue	19 minutes
Eglinton Avenue	16 minutes

Junction of Jane and Malton
Routes to Union Station

Both these routes would follow a common guideway located along the existing railroad corridor to Union Station. Convenient access to the industrial properties located along this section of the route would be provided and stations would be located at principal arterial streets. The system would interface with the Bloor Street subway at Dundas Street.

Approximate travel times from some points on this line to

Union Station would be as follows:

Rogers Rd.	15 minutes
Bloor St.	10 minutes
Queen St.	6 minutes

THE CROSSTOWN ROUTE

This route would extend from Weston Road to Victoria Park in an east-west direction along the Eglinton Ave. corridor. It would tie-in the northeast and northwest tributary routes and provide an interface with the Yonge St. subway and the future Spadina line.

From Weston Road the route would pass through a residential area where special attention will be given to the type and location of the structure in order to minimize the effect on the neighbourhood. In the vicinity of Castlefield Ave. it would pass through an industrial area where the right-of-way of the C.N.R. beltline would be utilized and followed as far as Spadina Rd. East of Spadina Rd. the system would be constructed beneath Eglinton Avenue to Birchcliffe Rd. where it would then emerge to the surface and follow the south side of Eglinton Ave. to Don Mills Road and Victoria Park Ave.

DESCRIPTION OF POSSIBLE CORRIDORS FOR INTERMEDIATE CAPACITY TRANSIT SYSTEM APPLICATION IN HAMILTON

Three possible corridors have been identified in Hamilton along which it would be feasible to construct an Intermediate Capacity Transit System:

Extending from Highway 2 and Main Street in the west, and running along the Toronto, Hamilton & Buffalo Railway, and the Chedoke Expressway rights-of-way. Rejoining the T.H. & B. right-of-way and following this alignment downtown, the west route could provide easy access to the central business district (C.B.D.) with a travel time of about 15 minutes.

The south route starting at Mohawk Road, would follow Highway 6, West 5th Street and Claremont Hill to join with the west route near Augusta Street. This could be a convenient route

to the C.B.D. for mountain residents. The travel time to downtown being approximately 7 minutes.

From the east side of the city, at Mount Albion Road, the east route could follow the T.H. & B. and Ontario Hydro rights-of-way to the CN mainline corridor. Constructed along this corridor, and proceeding southerly along the Fergusson Street industrial rail spur, the east route would join the south and west routes at the common merge point at Augusta Street. Travel time between the C.B.D. and Mount Albion Road would be approximately 20 minutes. A trip from Mount Albion Road to the industrial area north of Barton Street would take approximately 10 minutes.

DESCRIPTION OF POSSIBLE CORRIDORS FOR

INTERMEDIATE CAPACITY TRANSIT SYSTEM

APPLICATION IN OTTAWA

A feasible alignment for the application of an elevated transit system in the city of Ottawa takes the form of a "U".

Starting underground in the downtown area, the route could follow Scott Street, the Ontario Hydro right-of-way, the Queensway, and Carling Avenue and then along the planned Highway 416 right-of-way to the vicinity of Borden Farm in the southwest. Similarly, by following Nicholas Street, the Queensway, the Hydro right-of-way and the planned Highway 417 busway alignment, service could be extended to the Walkley Road area in the southeast.

Specific alignments and corridors need detailed evaluation but travel times along the route to the city centre would be less than 15 minutes using the alignments described.

To a large degree, it is the adverse environmental effects of conventional modes of transportation -- their noise, air pollution, visual intrusion, or excessive use of land -- that have made their application in urban areas sometimes difficult. New technology systems, because they have addressed the problem directly, have much improved environmental acceptability.

They are universally driven by electric motors which produce virtually no air pollution at the point of use, and are efficient in their use of energy resources.

To deal with the problem of noise pollution, the designers of the new technology systems have tried to eliminate major noise generators from vehicles. Partially for this reason,

quiet electric motors and rubber tire, magnetic, or air cushion support systems which produce little noise are used. Noise levels experienced at a distance of 50 feet from conventional systems (including expressways) often range between 80 - 100 dBA. By comparison, new technology systems should not exceed 60 dBA - about the level of a home air conditioner. Because a reduction of 10 decibels is approximately equivalent to an apparent halving of the noise level, this is a very significant improvement.

It is largely because of this very low output of noise that new technology systems can operate on elevated guideways and penetrate into most parts of the city. The guideways themselves are lightweight structures with slender columns and long span lengths and, properly designed can present considerable aesthetic opportunity. In addition, the elevated structures require very little use of land and do not interfere with the normal flow of pedestrian and vehicular traffic. They may pass through natural areas without destroying their value as habitat and it is even possible to develop "linear parks" along the route, similar to those already established beneath elevated portions of the BART system in San Francisco.

In their acceptability within the urban environment therefore, elevated new technology systems are second only to subways but they incorporate the additional advantage of causing a minimal disruption of the social and natural environment while under construction.

The three intermediate capacity transit systems and their developers currently making proposals for the planned transit demonstration system at Exhibition Park, Toronto, are summarized briefly as follows:

The FORD MOTOR COMPANY is known around the world for its automotive products, and has long and successful experience in this field. Headquarters are in the U.S.A., with subsidiaries in many countries, including Canada. Development of the automated control system is being conducted by Philco-Ford, a subsidiary of Ford.

The vehicles in the Ford system have a capacity of 24 passengers. They travel on rubber tires on their own exclusive track. The vehicles are guided and steered by horizontal rubber tires which travel along the vertical inner surfaces of the U-shaped

track. The vehicles are propelled by rotary DC motors driving through the suspension tires. Switching is achieved by an on-vehicle switch rather than by moving parts on the track; horizontal switching wheels are extended in the appropriate direction and engage a rail which guides the vehicle through the switch as desired. The automatic command and control system manages system operation: vehicle speed and spacing, safety, routing, and scheduling.

HAWKER SIDDELEY CANADA LTD. is a subsidiary of the Hawker Siddeley Company in Britain. Hawker Siddeley Canada has considerable experience in the transit field, having supplied buses and subway cars to the Toronto Transit Commission, and commuter rail cars to GO Transit.

Associated with Hawker Siddeley Canada in the venture are two British firms: Hawker Siddeley Dynamics Limited with experience in design and construction of military and civil aircraft,

avionics, and various types of control systems, who will design the automatic control system for the Hawker Siddeley transit system; and Tracked Hovercraft Limited, designers of the propulsion system, who are developing advanced forms of high speed intercity ground transport.

The vehicles in the Hawker Siddeley system have a capacity of 20 passengers. They too, travel on rubber tires on their own exclusive track. Lateral guidance and steering are achieved through horizontal rubber tires running along guidance rails on the track. The track is basically U-shaped with partially open sides. The vehicles are propelled by linear induction motors which do not drive through the suspension tires and hence do not rely on wheel/track friction for acceleration or deceleration. Energisation of the motor "primary" on-board the vehicle, produces a relative thrust between the primary on the vehicle and the "secondary" rail installed on the track which is used for acceleration or braking. Switching is achieved by an on-vehicle switch similar to that on the Ford system. The automatic command and control system manages system operation: vehicle speed and spacing, safety, routing and scheduling.

KRAUSS-MAFFEI AG of Munich, Germany, has been building railway locomotives and rolling stock for 130 years, and consequently has a strong background in rail equipment. In recent years, more advanced forms of transport have been under development at Krauss-Maffei.

Associated with Krauss-Maffei on the automatic control system and propulsion control system, are several well-established firms with long experience in these fields.

The Krauss-Maffei vehicles have a capacity of 20 passengers. The vehicles are supported by frictionless magnetic forces.

Lateral guidance and steering are also achieved by means of magnets. Vehicles are propelled by linear induction motors. The track is equipped with the magnetic armature rails and the secondary of the linear motor. Switching is achieved by magnet control, and requires no moving parts in either track or vehicle. The automatic command and control system performs functions similar to those listed for Ford and Hawker Siddeley.

Common to all systems will be the ability to operate at speeds up to 50 mph, either singly or with entrained vehicles. The systems will be able to deliver substantial line capacities even with relatively small vehicles because of the design for short spacings between vehicles. At the same time, because of their control system and switching capabilities, they will have the potential for providing more convenient, personal service, at off-peak periods of the day.

The Evaluation Program

The intermediate capacity system evaluation study currently underway is being carried out according to the following schedule.

Dec. 1971	Eight systems developers invited to participate in study and supply information on their systems, as requested.
17 Mar. 1972	Eight systems developers made technical data submissions.
1 Aug. 1972	Three of the eight systems selected for detailed evaluation; systems developers to prepare technical design and cost proposals for Toronto demonstration system at the CNE.
1 Feb. 1973	Three systems developers to submit technical design and cost proposals.
1 Apr. 1973	Selection of one system for detailed design, construction and demonstration at the CNE.
1 Dec. 1974	Commissioning of demonstration system and beginning of design and construction of first route.
31 Dec. 1975	End of Test Program.
31 Dec. 1977	Target date for completion of first urban route.

The CNE demonstration is an essential step in the process of implementing the system on a large scale. Whichever system is selected, it will incorporate new technology in suspension, propulsion, or automated control. The implementation history of conventional systems has graphically illustrated the design and debugging problems that can be encountered in starting a new operation. It is only realistic to anticipate that these problems may be aggravated where new technology is being applied. The demonstration system will provide the opportunity for identifying and solving such initial implementation problems before the system is required to provide good service to the passenger in full revenue operation. Further invaluable

information obtained from the testing program will indicate areas of necessary redesign that will result in an improved transit system when implemented on a large scale. The demonstration system will also provide useful experience and information on system operation, operating costs, all-weather performance, reliability, and durability. Finally, even after large-scale system implementation, the CNE demonstration system will provide service to Exhibition Park and Ontario Place by means of a connection to the larger system, and will also serve as a test track for further design improvements in the system.

DE LEUW, CATHER & COMPANY OF CANADA LTD.
M. M. DILLON LIMITED

transportation consultants

summary statement on development and implementation of intermediate capacity rapid transit

17 NOV. 1972

SUMMARY STATEMENT ON

DEVELOPMENT AND IMPLEMENTATION

OF INTERMEDIATE CAPACITY RAPID TRANSIT

DELEUW CATHER/DILLON

TRANSPORTATION CONSULTANTS

The consulting firms of DeLeuw Cather of Canada Limited and M.M.Dillon Limited were retained to carry out an independent evaluation of realistic development and implementation of new and improved intermediate capacity rapid transit technology. The Consultants' independent study confirmed the data on implementation times which were developed as part of the comprehensive evaluation of rapid transit technology undertaken by the Research Division of the Ontario Ministry of Transportation and Communications.

An examination was made of the application of the new system and components to specific Ontario urban areas.

The two consultants were selected for this task on the basis of their extensive experience in transportation projects in Canada and overseas, including:

- the evaluation of 25 different types of transit vehicles and guideways.
- planning rapid transit systems for 16 urban areas.
- design and construction supervision of rapid transit facilities in 5 cities.

The members of the DeLeuw/Dillon Study Team backed up their own knowledge and experience by consulting with experts responsible for rapid transit development within government and industry in Canada, Great Britain, Germany, France and the United States. Innovations being actively developed were evaluated to determine which ones would significantly improve

rapid transit in terms of service to the public, environmental impact and cost, and when they could be implemented in public service. The complete systems being proposed by systems developers were considered. In addition, the various components being developed by industry were evaluated.

In brief, the Consultant's findings are that the widespread public interest and massive financial support being given by governments and industry throughout the world to rapid transit research and development will produce early and meaningful improvements in rapid transit technology. Futher developments will come rapidly and on a continuous basis.

Our conclusions are that:

- new technology available now will provide significant improvements in rapid transit,
- many of the technical innovations can be introduced into public service within 5 years,
- transitways can be built for technology today which will also be adaptable to innovations as they emerge.

We are impressed by the efforts of the Government of Ontario to promote and develop the newest and best forms of intermediate capacity rapid transit. This, together with the idea of a comprehensive network for the larger urban municipalities, places this Province in the forefront of those who seek the best solution to today's growing transportation problem.

NEW TRANSIT TECHNOLOGY

A NEW WAY TO GO/ONTARIO

MINISTRY OF TRANSPORTATION
AND COMMUNICATIONS